

Smart Mobility FRAMEWORK

Smart Mobility Performance Measures

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Smart Mobility Principles

1. Location Efficiency
2. Reliable Mobility
3. Health and Safety
4. Environmental Stewardship
5. Social Equity
6. Robust Economy

Smart Mobility
FRAMEWORK



Smart Mobility Performance Measures (Part 1)

Principle	Performance Measure
Location Efficiency	1. Support for Sustainable Growth
	2. Transit Mode Share
	3. Accessibility and Connectivity
Reliable Mobility	4. Multi-Modal Travel Mobility
	5. Multi-Modal Travel Reliability
	6. Multi-Modal Service Quality
Health and Safety	7. Multi-Modal Safety
	8. Design and Speed Suitability
	9. Pedestrian & Bicycle Mode Share



Smart Mobility Performance Measures (Part 2)

Principle	Performance Measure
Environmental Stewardship	10. Climate and Energy Conservation
	11. Emissions Reduction
Social Equity	12. Equitable Distribution of Impacts
	13. Equitable Distribution of Benefits
Robust Economy	14. Congestion effects on Productivity
	15. Efficient Use of System Resources
	16. Network Performance
	17. Return on Investment



Smart Mobility Concepts

1. Multi-Modal Focus
2. Speed Suitability
3. Activity Connectedness
4. Network Management



Smart Mobility Concepts 1-2

1. Multi-Modal Focus

- all transportation system users
- replace auto-oriented measures
- e.g.: safety, travel time, reliability, LOS

2. Speed Suitability

- context-sensitive target speed, instead of “design speed” based only on facility type
- enforce through physical design features and speed management techniques



1. Multi-Modal LOS in 2010 HCM

- **Auto**: stops/ mile, % speed limit, median, turn lanes
- **Transit**: wait time, ride time, loading, ped LOS
- **Pedestrians**: ped density, sidewalks, buffers, street width, traffic level
- **Cyclists**: lane width, traffic and truck count and speed, parking, pavement and stops



2. Speed Suitability Improves Safety for all Users

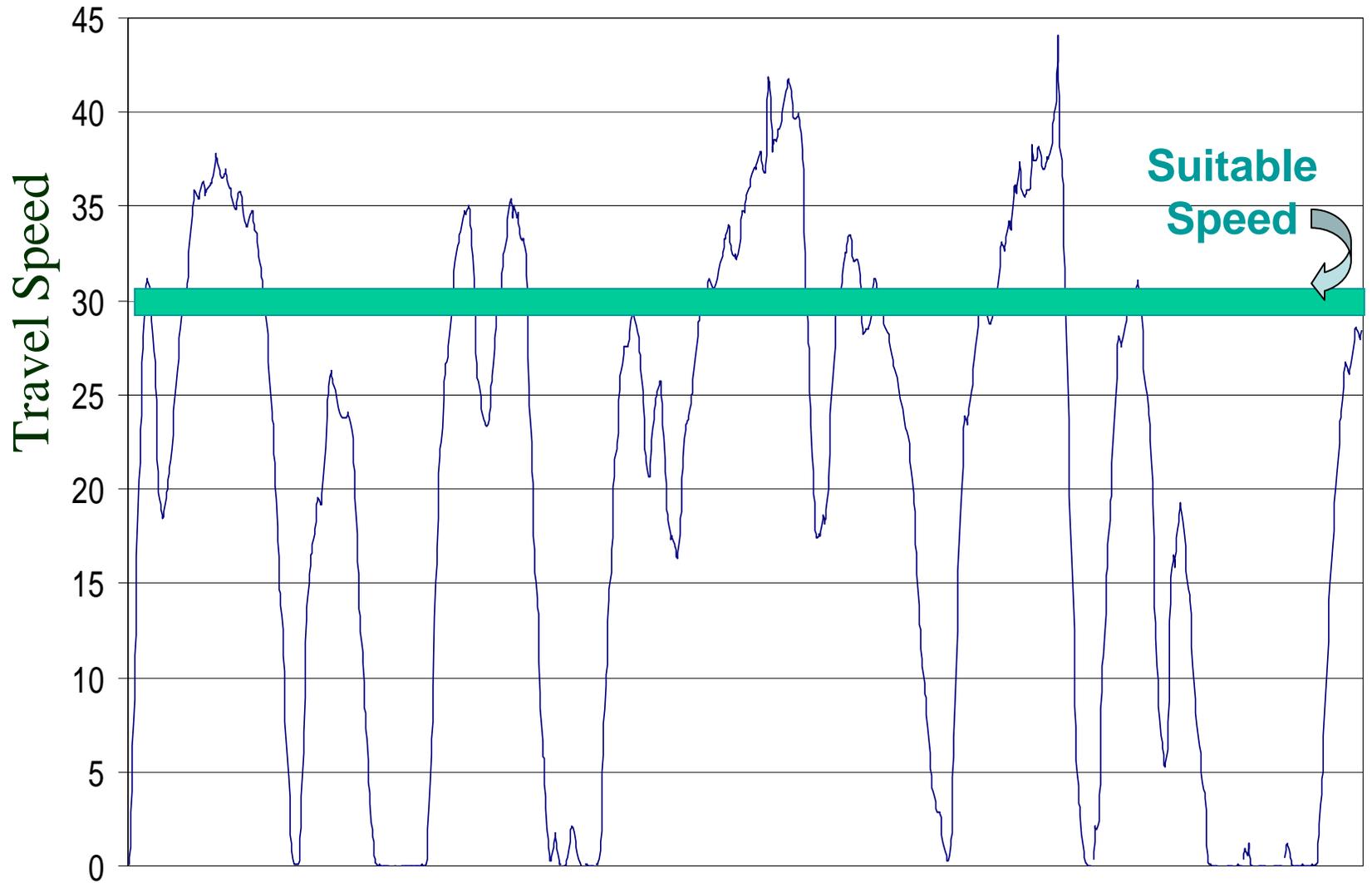


At **40 mph** the driver's focus is on the roadway in the distance.

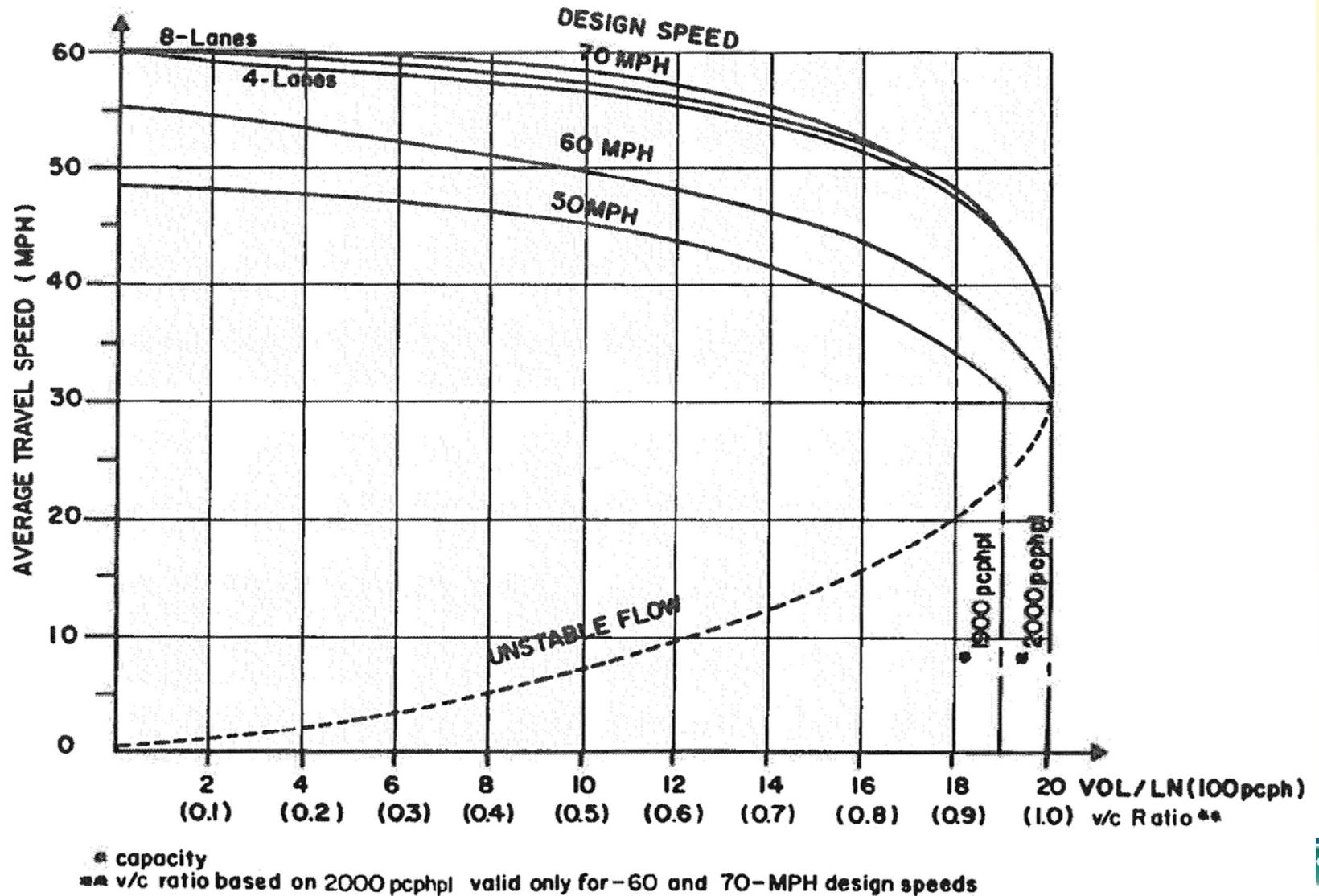


At **30 mph** the driver begins to see things at the road edges in the background.

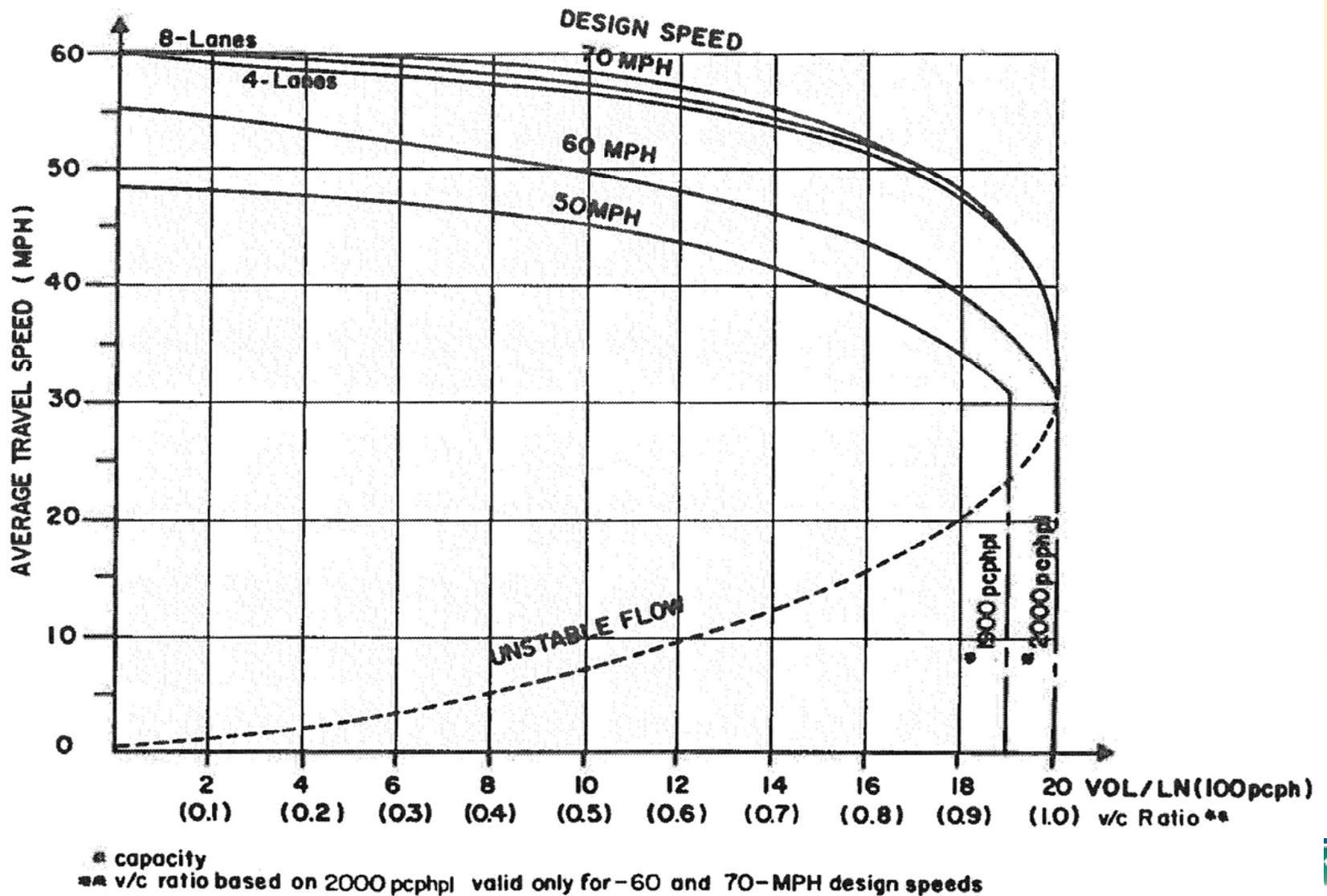
Objective-Based Speed Management



Speed Management and Carrying Capacity



Speed Management and Carrying Capacity



Smart Mobility Concepts 3-4

3. Activity Connectedness

- travel distances and modal connections among activities
- minimize induced development and induced travel.
- minimize total vehicle miles traveled (VMT)

4. Network Management

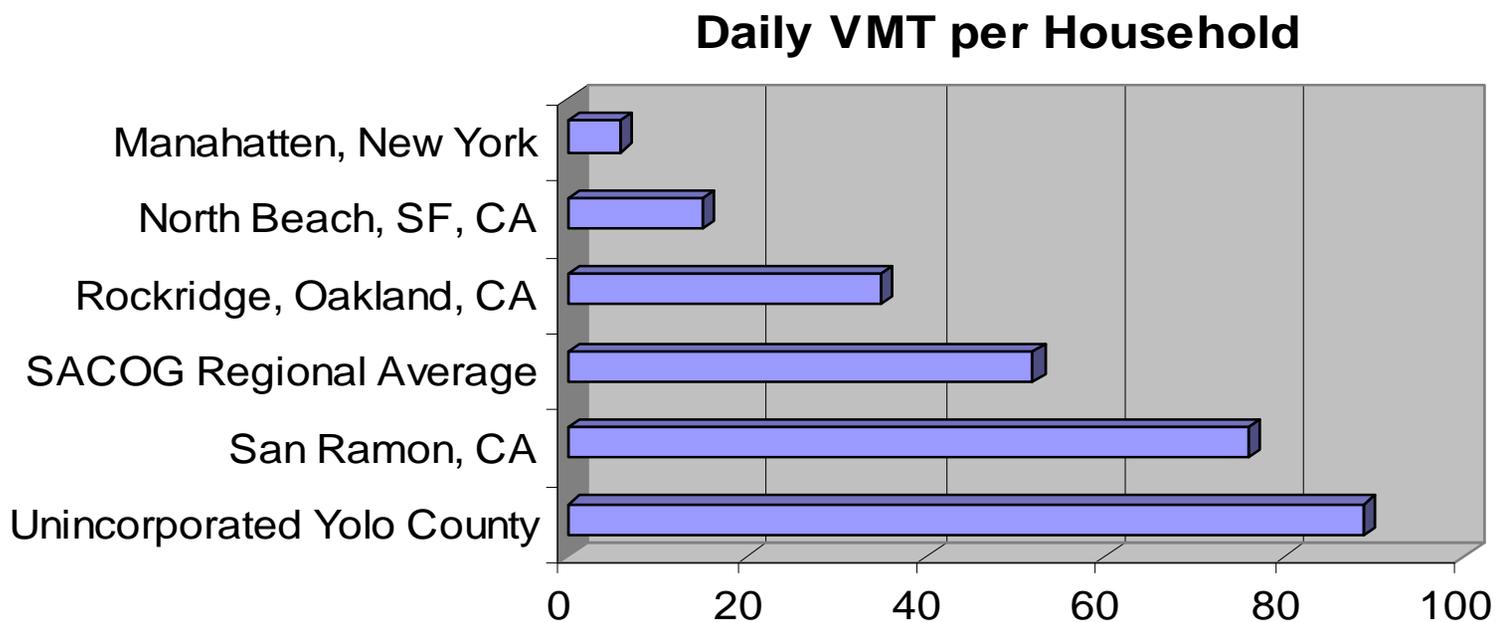
- accommodate greatest number of travelers with minimal instability.
- emphasize network connectivity
- emphasize efficiency, ITS



Transportation Growth Constraint: 30% traffic growth/ 10% cap. growth



Daily VMT per Household

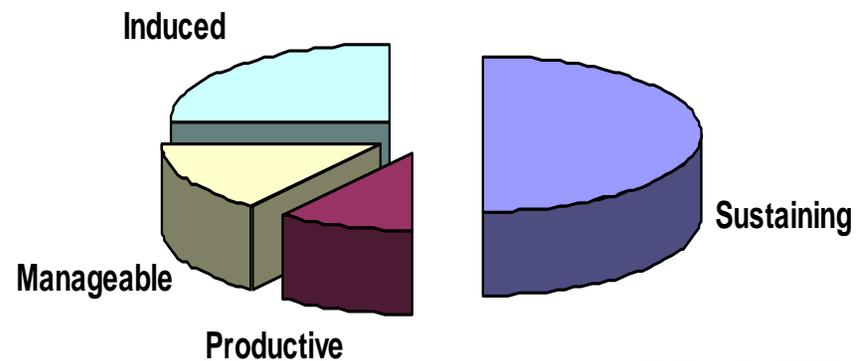


4. Network Management vs System Expansion

- Address in Blueprints and RTP SCS
 - Transportation improvements support SCS
 - Address interregional travel
 - Limit induced travel

- Types of per capita VMT

- Sustaining
- Manageable
- Productive
- Induced



**Smart Mobility
FRAMEWORK**



Network Management Strategies

Congestion Mitigation

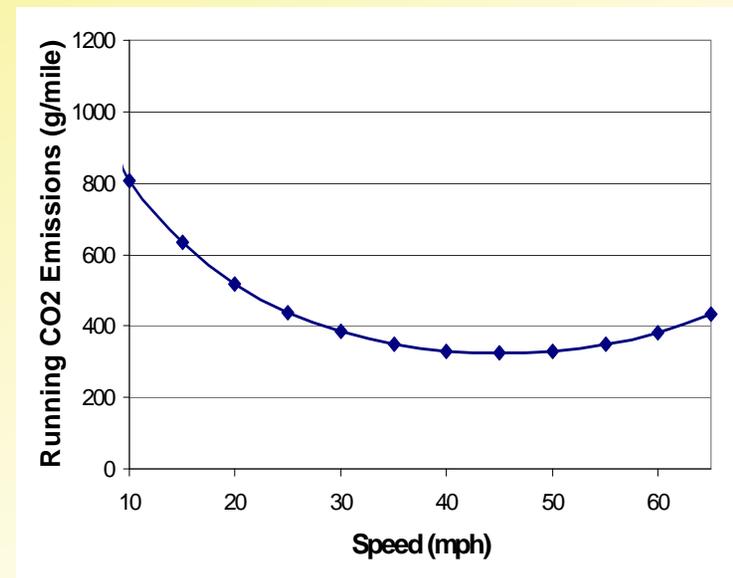
- Signal coordination
- Ramp metering
- Incident management

Flow Smoothing

- Variable speed limit
- Intelligent speed adapt.

Speed Management

- Improved enforcement
- Speed limiters
- Active accelerator pedal



Barth, Matthew; *ITS and the Environment*, UCR, 2008



Reduced Footprint and Costs for Construction and Maintenance

- narrower total roadway width
- tighter curvature*
- narrower clear zones
- lower super-elevation
- smaller intersections/ interchanges

*Tighter Curvature	50 mph	70 mph
Horizontal Curvature	1000 feet	2500 feet
Vertical Curvature	1000 feet	3000 feet



Performance Measures with Equity Dimensions

- Accident rates
- Speed suitability
- Modal mobility, consistency
- Activity connectedness
- Universal Accessibility (ADA)
- Emissions and noise impacts
- Land use efficiency
- LOS



Smart Mobility FRAMEWORK

Smart Mobility
Performance Measures

Questions?

